



MARINE CONTROL SYSTEM

INSTALLATION AND SERVICE MANUAL FOR LOGICMASTER CONTROL UNIT

PART NO. R431007538 (P -090141-00000)



⚠ WARNING: INSTALLATION AND MOUNTING

The user of these devices must conform to all applicable electrical, mechanical, piping and other codes in the installation, operation or repair of these devices.

INSTALLATION! Do not attempt to install, operate or repair these devices without proper training in the technique of working on pneumatic or hydraulic systems and devices, unless under trained supervision.

Compressed air and hydraulic systems contain high levels of stored energy. Do not attempt to connect, disconnect or repair these products when a system is under pressure. Always exhaust or drain the pressure from a system before performing any service work. Failure to do so can result in serious personal injury.

MOUNTING! Devices should be mounted and positioned in such a manner that they cannot be accidentally operated.

TABLE OF CONTENTS

TITLE	PAGE
GENERAL DESCRIPTION	2
DESCRIPTION OF OPERATION	2
ADJUSTMENTS & SETTINGS	3
COMPONENT LOCATION & MATERIALS	4
SCHEMATIC DIAGRAM	5
INSTALLATION DATA	6
SERVICE PARTS INFORMATION	8-11
SHUTTLE VALVE	
FLOW CONTROL VALVE	
MULTI-FUNCTION LOGIC VALVE	
LOGIC TIMER UNIT	

GENERAL DESCRIPTION

The LOGICMASTER® Control Unit is designed for service with hydraulic clutch reverse gears.

The LOGICMASTER combines proven, dependable control components into a factory assembled and tested unit ready for shipboard installation.

Shipboard piping connections are made to the tapped manifold connections as specified on installation diagram. Care must be exercised in the shipboard installation and piping to insure a satisfactory control installation.

The LOGICMASTER Unit should be located in close proximity to the reverse gear to minimize the length of tubing runs to the reverse gear selector cylinder, and engine governor actuator, and the trolling valve positioned.

All tubing runs should be securely fastened and insulated, where necessary for maximum protection against vibration damage and metal-to-metal surface chafing. Tubing runs should be located such that they will be protected and not in exposed locations susceptible to undesired usage, such as foot steps or hand holds, which may lead to breakage or ultimate flattening of the tubing with consequent flow restrictions. Flexible connections should be provided between all engine mounted devices and connections. All tubing bends should be accomplished with smooth radius bends to avoid pinching and flow restriction.

IMPORTANT - All tubing lines should be blown through with clean, dry air prior to making the final connection at each end to insure that all cuttings, chips, dirt, and foreign material is removed. If brazed or soldered connections or couplings are used, extreme care should be exercised to insure that flux is not introduced into the control lines. All piping connections should be pressure tested to insure zero leakage.

For optimum service, a constant 100 psi (6.9 bar) air supply should be maintained for the control system. Adequate precautions should be taken in the shipboard air system to insure a reasonably clean, dry air supply for the control system and LOGICMASTER Unit operation.

Factory recommended control systems provide for filtering of the supply air to remove foreign material. Adequate shipboard procedures must be exercised to insure that the main ship's air supply system is properly drained and maintained to prevent excessive condensation and moisture carry-over into the control system supply.

DESCRIPTION OF OPERATION

This control system provides interlocked and sequenced operation of the reverse gear engagement and engine speed control to insure proper operation of the propulsion machinery no matter how the operator manipulates the remotely mounted control lever. The control system incorporates the following interlocks and operational features.

1. TIME REVERSING INTERLOCK . . .

Holds the reverse gear control in neutral position for a preset time on reversals, even though the remote control lever is shifted directly through neutral. This allows the engine and propeller speed to decrease to an acceptable level before reversal is initiated. Timing is adjustable.

2. THROTTLE CONTROL INTERLOCK . . .

The throttle control interlock and intercept delay timer allows the clutch control to shift before engine speed advances from the remote control station to prevent high engine speed during clutch engagement and resultant gear wear.

1. REVERSAL INTERLOCK TIMING

The control system will operate in the following manner:

For Ahead operation, a signal is delivered from the remote control station into LOGICMASTER® connection 1C to the normally open reversing interlock valve (10). This pressure passes through valve (10) out connection 1A to activate the reverse gear control cylinder into Ahead position. The Ahead signal also passes

1. Through shuttle valve (1) to throttle intercept delay timer (7) and to activate throttle intercept valve (8) to connect the remote speed line through to valve (11) to the governor actuator.

In the event of a loss of control air supply, interlock valve (8) will open to exhaust the speed signal at the governor actuator which will reduce the engine speed to idle thus alerting the operator to the problem.

2. Ahead signal passes through timer unit (5) to the control connection of interlock valve (9) installed in the Astern line 3C. Valve (9) is actuated to intercept the astern line and prevent any astern actuation until the ahead signal is fully vented. Thus on reversals, a neutral time interlock is provided to permit the engine and propeller speeds to decrease to an acceptable level before reversal is initiated. The neutral time is adjustable by means of timer unit (5) for ahead to astern and (6) for astern to ahead.

FLOREG® Flow Control Valve(5) and (6), in conjunction with interlock valves (9) and (10), provide a reversal time interlock to insure that the rotation change-over valve is held in neutral for a preset time on reversals, even though the remote control lever is shifted directly through neutral. This allows the engine speed to decrease to an acceptable level before reversal is initiated and for application of shaft brake to stop the propeller. To shorten the timing, back out on the adjusting screws for

timer unit (5) and (6) as required. Turn in to lengthen amount of time Unit (5) controls timing from Ahead to Astern. Unit (6) controls timing from Astern to Ahead. This timing is factory set for 4 seconds.

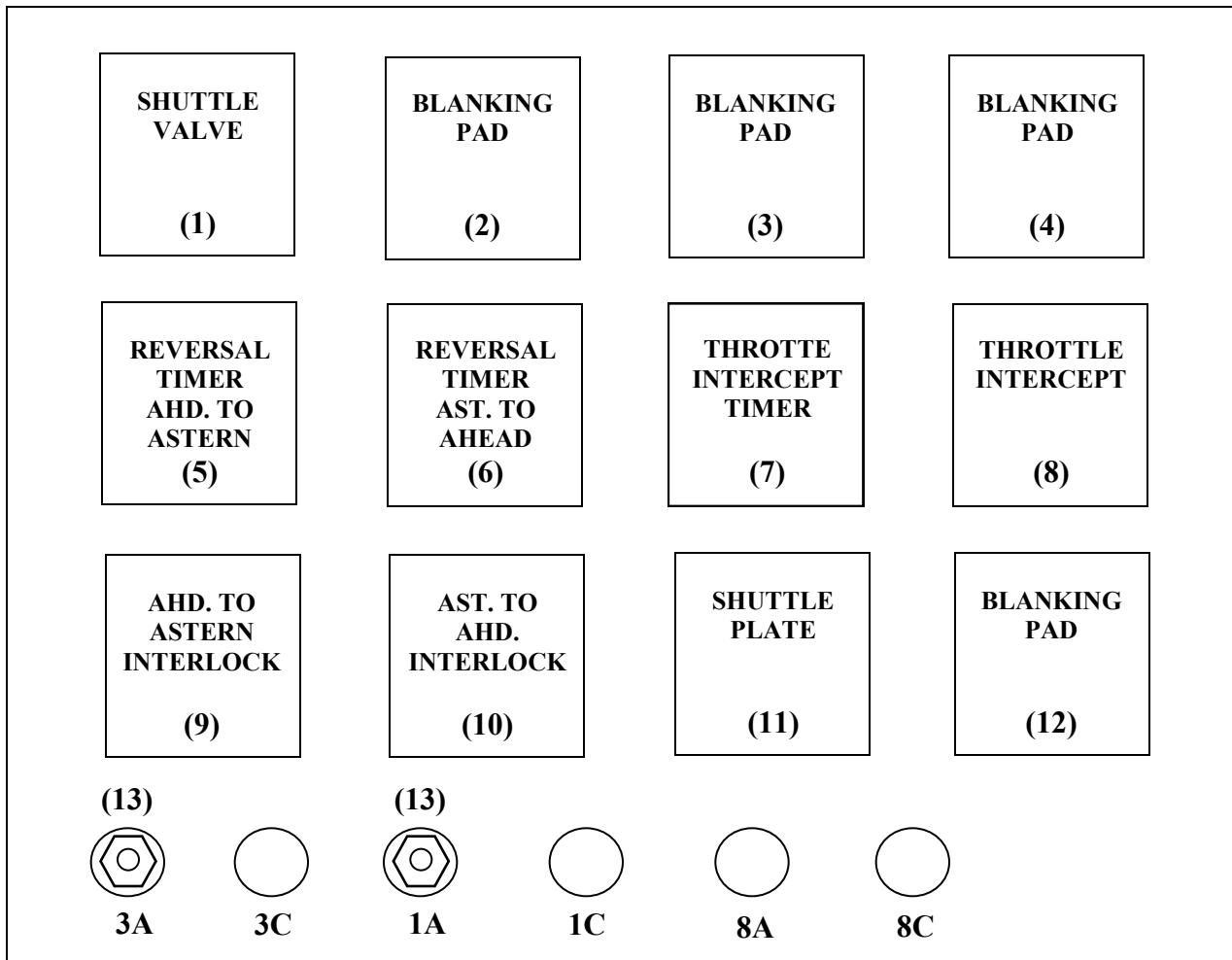
2. THROTTLE INTERCEPT TIMER

Throttle control is applied to the engine at a controlled rate by the actuation of interlock valve (7) when a direction signal is applied from remote control station to the reverse gear shifting cylinder. The time required for the throttle signal to increase from idle to full speed is controlled by Floreg Valve (7). This is factory set for a four-second delay. To shorten this time, the adjusting screw should be turned in to lengthen time delay. The effect of the setting can be observed by the response of the governor actuator during operation.

ADJUSTMENTS & SETTINGS

The following adjustments and settings are made during the factory test of the LOGICMASTER unit but may require additional tuning on shipboard to provide the optimum system operation. All factory adjustments are accomplished with a control system operating pressure of 100 psi (6.9 bar).

COMPONENT LOCATION & MATERIAL LIST

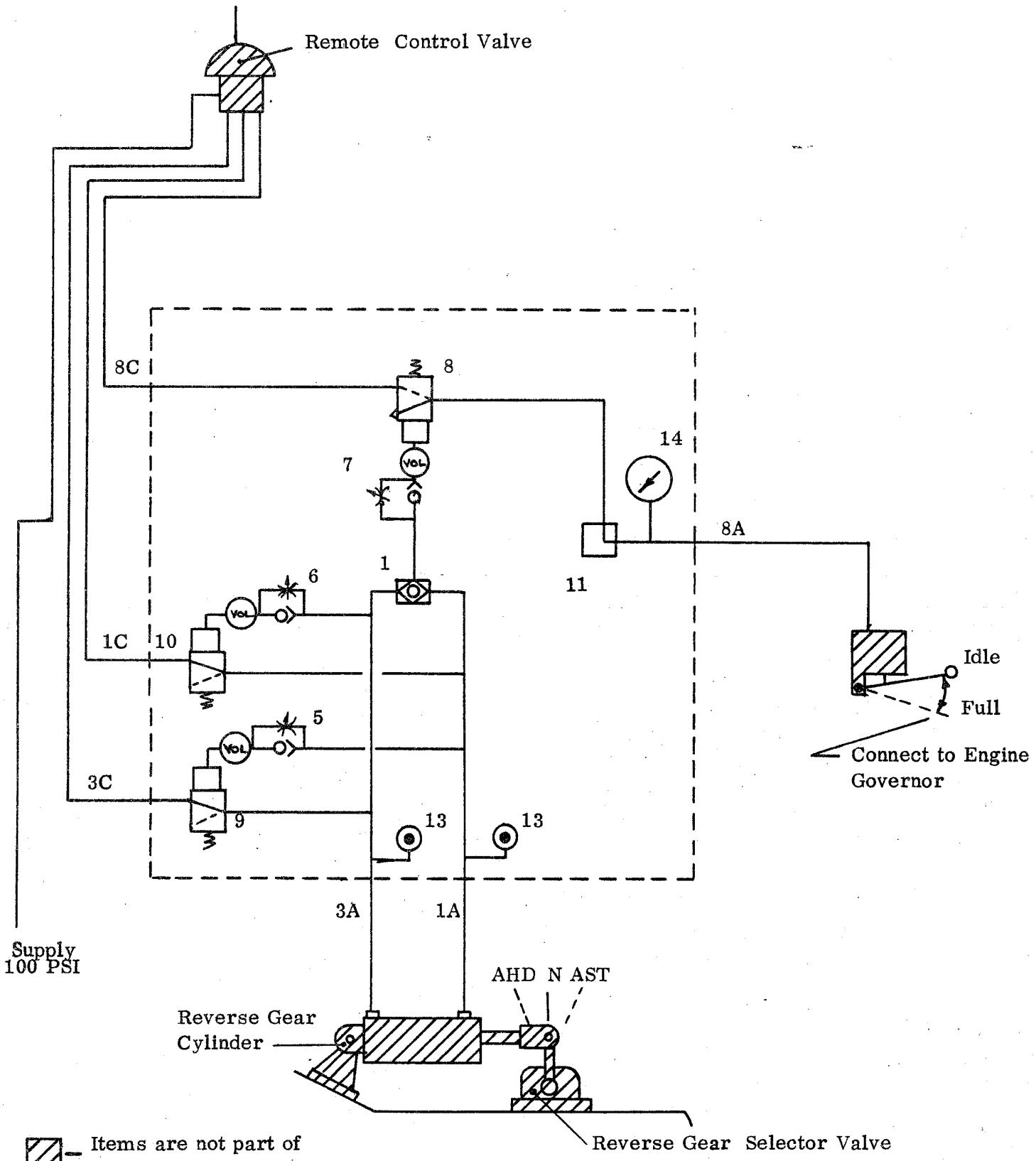


Plug

LOGICMASTER® CONTROL PANEL

REF.	NEW PART NO.	OLD PART NO.	DESCRIPTION
1	R431005928	P -061971-00000	Shuttle Valve
2 & 4	R431006237	P -063396-00002	Blanking Pad
3 & 12	R431006237	P -063396-00002	Blanking Pad
5 & 6	R431006336	P -064003-00001	Timer Unit - consisting of: Flow Control R431005931 (Old part no. P -061975-00002) and Volume R431006227 (Old part no. P -063395-00003)
7	R431006335	P -064003-00000	Timer Unit - consisting of: Flow Control R431005931 (old part no. P -061975-00002) and Volume R431006228 (old part no. P -063395-00004) (time in)
8	R431005980	P -062016-00004	Multifunction Logic Valve - 80 psi
9	R431005976	P -062016-00000	Multifunction Logic Valve - 15 psi
10	R431005976	P -062016-00000	Multifunction Logic Valve - 15 psi
11	R431007021	P -067150-00001	Shuttle Plate
13	R431006263	P -063431-00000	Pressure Indicator
14	R431002134	P -049788-00008	Air Gage

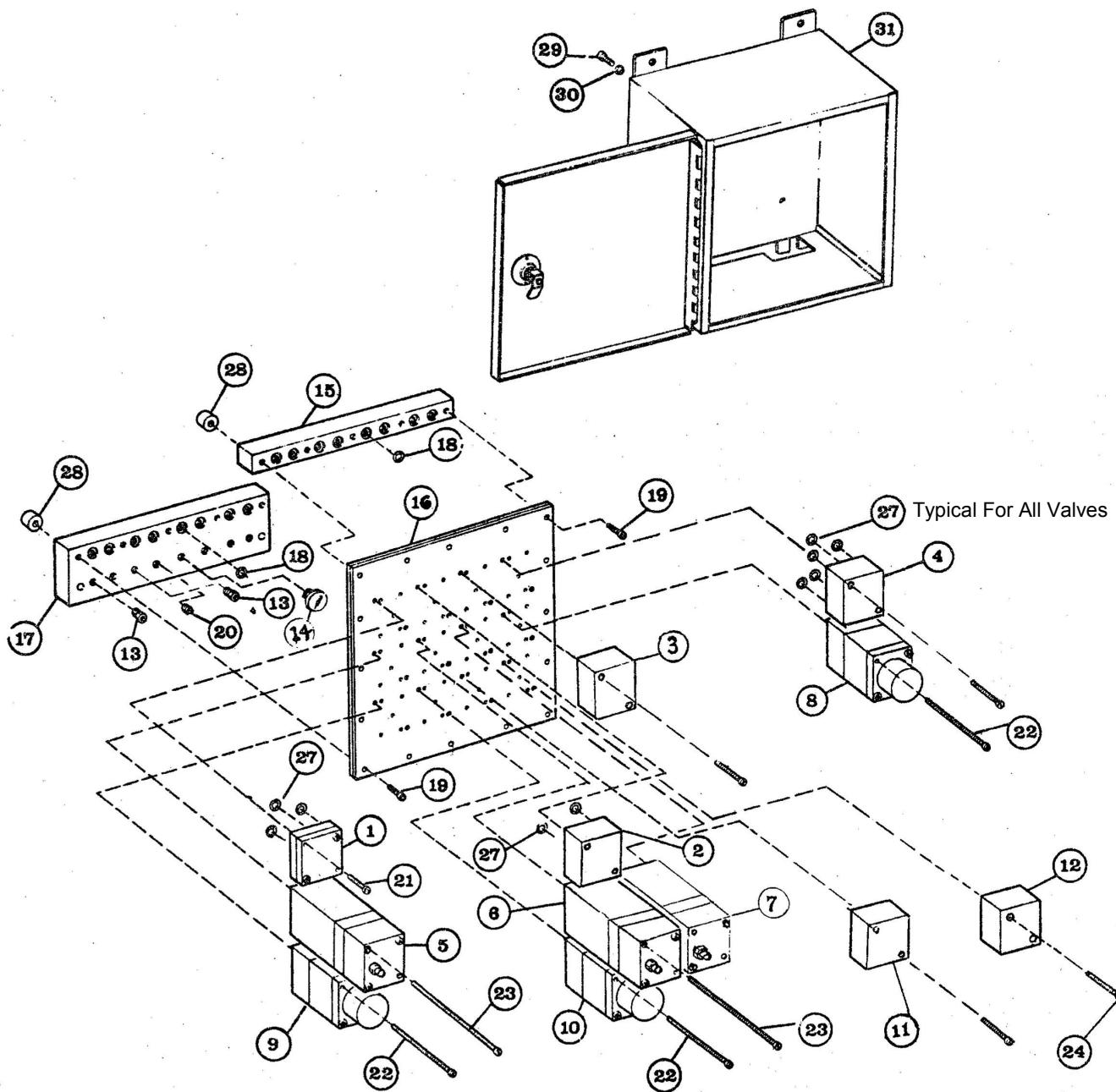
LOGICMASTER® CONTROL UNIT SCHEMATIC
R431007538 (P -090141-00000)



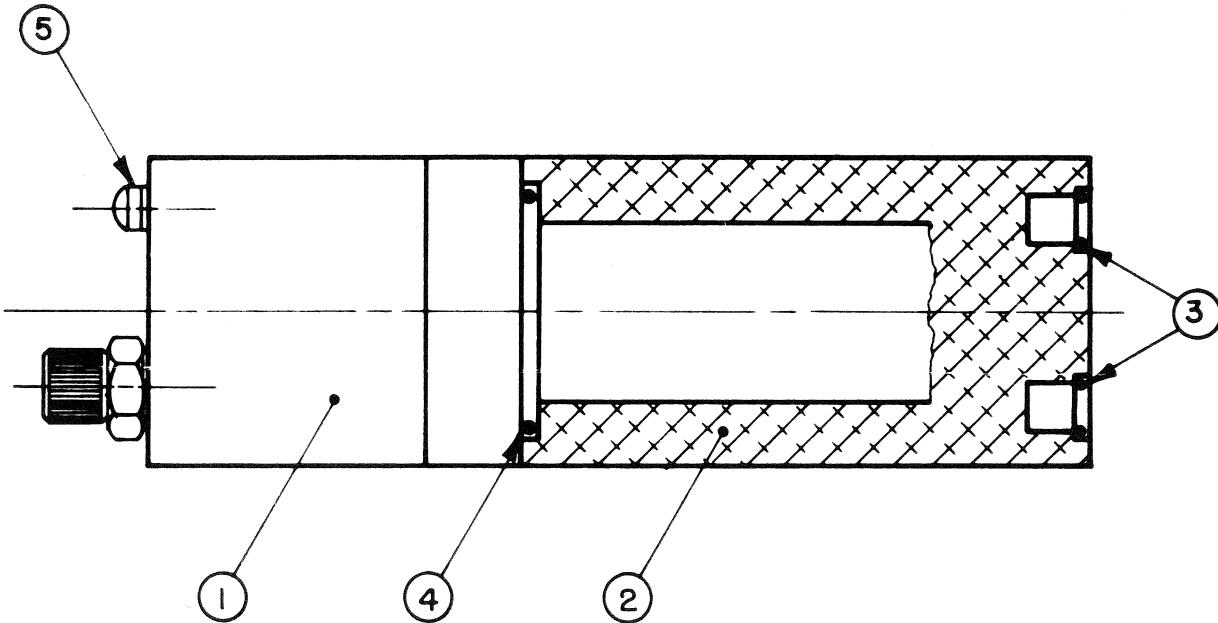
PARTS LIST
LOGICMASTER® UNIT

REF.	QTY.	DESCRIPTION	NEW PART NO.	OLD PART NO.
1	1	Shuttle Valve (See page 10)	R431005928	P -061971-00000
2, 3 & 4	2	Blanking Plate	R431006237	P -063396-00002
5 & 6	2	Timer unit (See page 8) - Consisting of:	R431006336	P -064003-00001
		(A) - Flow Control Valve (See page 9)	--	--
		(B) - Timing Volume (Time Out)	--	--
7	1	Timer Unit (See page 8) - Consisting of:	R431006335	P -064003-00000
		(A) - Flow Control Valve (See page 9)	--	--
		(B) - Timing Volume (Time In)	--	--
8	1	Logic Valve - 80 psi (See page 11)	R431005980	P -062016-00004
9 & 10	2	Logic Valve - 15 psi (See page 11)	R431005976	P -062016-00000
11	1	Shuttle Plate	R431007021	P -067150-00001
12	1	Blanking Plate	R431006237	P -063396-00002
13	2	Pressure Indicator	R431006263	P -063431-00000
14	1	Air Gage (0-160)	R431002134	P -049788-00008
15	1	Upper Header Bar	R431006045	P -062370-00000
16	1	Circuit Plate Assembly	R431007533	P -090070-00001
17	1	Lower Header Bar	R431006262	P -063430-00000
18	16	"O" Ring Seal	R432012138	P -049708-00012
19	10	All Screw, No. 8 x 1"	R431002312	P -049856-00124
20	9	Pipe Plug	R431002133	P -049787-00000
21	4	Mounting Screw, No. 8 x 1 1/2"	R431001772	P -049467-00013
22	6	Mounting Screw, No. 8 x 3 1/2"	R431001771	P -049467-00012
23	6	Mounting Screw, No. 8 x 5 1/2"	R431001775	P -049467-00016
24	8	Mounting Screw, No. 8 x 2"	R431001768	P -049467-00007
27	54	"O" Ring Seal	R431002010	P -049708-00106
28	4	Spacers	R431006270	P -063458-00000
29	4	Mounting Screw	R431002247	P -049835-00014
30	4	Lockwasher	R431002572	P -049982-00006
31	1	Enclosure	R431006271	P -063459-00000

LOGICMASTER® CONTROL UNIT



LOGIC TIMER UNIT

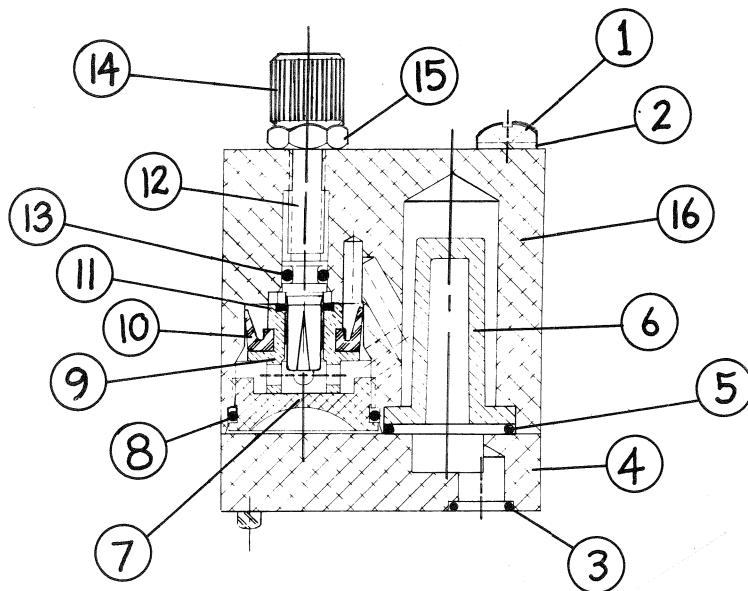


Logic Timer Unit, Complete	Time In Time Out	New Part No. R431006335 R431006336	Old Part No. P -064003-00000 P -064003-00001
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REF.	QTY.	DESCRIPTION	NEW PART NO.	OLD PART NO.
1	1	Logic Flow Control Valve (See parts list B6-105.03)	R431005931	P -061975-00002
2	1	Volume - Time In - For R431006335 (P -064003-00000)	R431006228	P -063395-00004
	1	Volume - Time Out - For R431006336 (P -064003-00001)	R431006227	P -063395-00003
*3	2	"O" Ring, 3/8" O.D.	See Kit	See Kit
*4	1	"O" Ring, 1" O.D.	See Kit	See Kit
5	2	Mounting Screw, No. 8-32 x 5-1/2" LG	R431001775	P -049467-00016

* Kit part number: R432006224 (Old part number: P -063393-00000)

LOGIC FLOW CONTROL VALVE

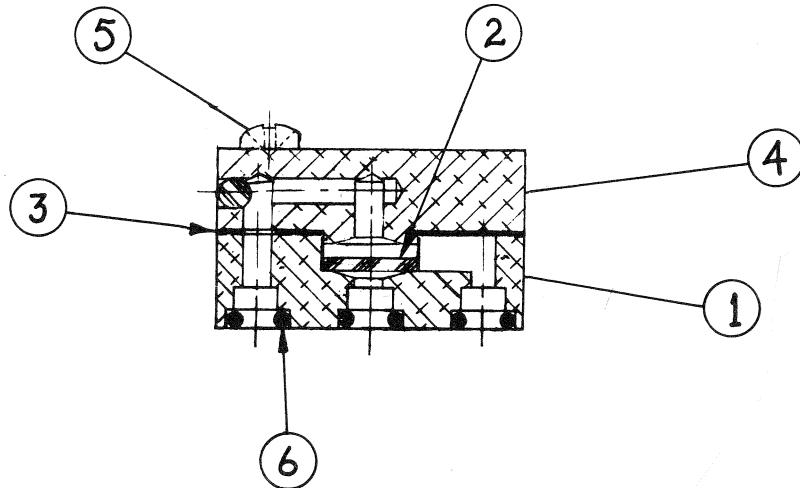


LOGIC FLOW CONTROL VALVE, Complete R431005931 (P -061975-00002)

REF.	QTY.	DESCRIPTION	NEW PART NO.	OLD PART NO.
1	2	SCREW, 8-32 x 1 3/4	R431001692	P -049109-00002
2	2	LOCKWASHER	R432012235	P -049866-00003
3*	2	"O" RING, 3/8" O.D.	See Kit	See Kit
4	1	BASE	R431005956	P -062000-00000
5*	2	"O" RING, 9/16" O.D.	See Kit	See Kit
6	2	FILTER	R431005954	P -061999-00000
7	1	CAP	R431005953	P -061998-00000
8*	1	"O" RING, 3/4" O.D.	See Kit	See Kit
9	1	GUIDE	R431005952	P -061997-00000
10*	1	"U" CUP	See Kit	See Kit
11*	1	"O" RING, 5/16" O.D.	See Kit	See Kit
12	1	SCREW, Regulating	R431005951	P -061996-00000
13*	1	"O" RING, 1/4" O.D.	See Kit	See Kit
14	1	NUT, Knurled	R431006292	P -063497-00000
15	1	JAM NUT, 10-48 Hex.	R431002426	P -049901-00036
16	1	HOUSING	R431005950	P -061995-00000

* Recommended spare parts to be retained in stock.
Available in Repair Kit form, R432006224 (P -063393-00000)

LOGIC SHUTTLE VALVE



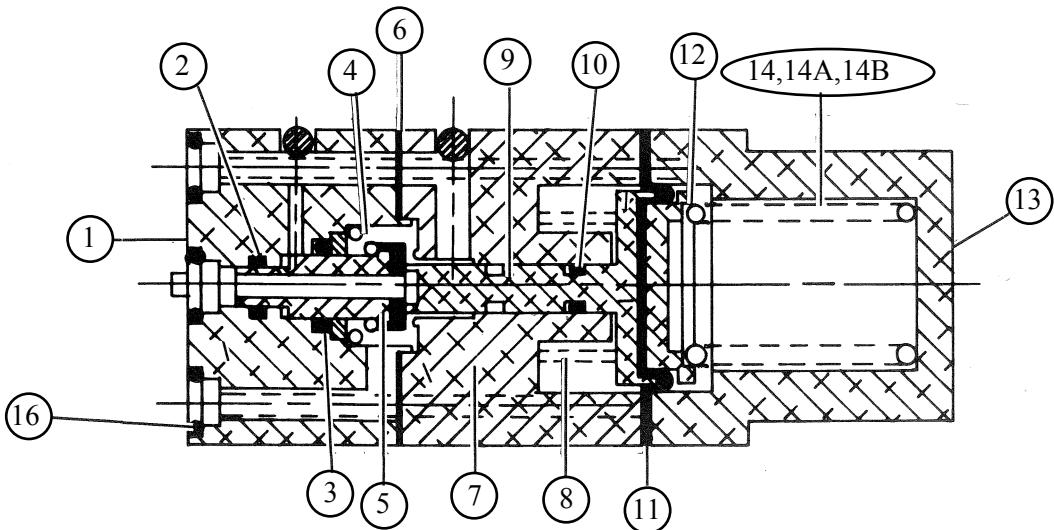
LOGIC SHUTTLE VALVE, Complete R431005928 (P -061971-00000)

REF.	QTY.	DESCRIPTION	NEW PART NO.	OLD PART NO.
1	1	BODY	R431005938	P -061979-00001
2*	1	DIAPHRAGM	See Kit	See Kit
3*	1	GASKET	See Kit	See Kit
4	1	COVER	R431005940	P -061980-00001
5	2	SCREW, 8-32 x 3/4	R431001690	P -049109-0000
6*	3	"O" RING, 3/8 O.D.	See Kit	See Kit

* Recommended spare parts to be retained in stock.
Available in Repair Kit Form, R431006240 (P -063400-00000)

MULTIFUNCTION LOGIC VALVE

PART NO. R431005976 (P -062016-00000)



MULTIFUNCTION LOGIC VALVE (15 psi) Complete
MULTIFUNCTION LOGIC VALVE (30 psi) Complete
MULTIFUNCTION LOGIC VALVE (80 psi) Complete

R431005976 (P -062016-00001)
R431005977 (P -062016-00004)
R431005980 (P -062016-00004)

REF.	QTY.	DESCRIPTION	NEW PART NO.	OLD PART NO.
1	1	BODY	R431007038	P -067247-00000
2*	1	O-RING, 7/32" x 11/32"	See Kit	See Kit
3*	1	O-RING, 3/8" x 1/2"	See Kit	See Kit
4	1	SPRING, Supply Valve	R431006176	P -063075-00000
5*	1	VALVE, Supply	See Kit	See Kit
6*	1	GASKET, Body	See Kit	See Kit
7	1	BODY, Valve Seat	R431007041	P -067249-00000
8	1	SPRING, Exhaust Valve	R431003030	P -052889-00000
9	1	SEAT, Exhaust Valve	R431005945	P -061986-00001
10*	1	O-RING, 1/8" x 1/4"	See Kit	See Kit
11*	1	DIAPHRAGM	See Kit	See Kit
12	1	SEAT, Spring	R431005946	P -061987-00000
13	1	COVER	R431007028	P -067156-00000
14	1	SPRING, Regulating (15 psi)	R431005964	P -062012-00000
14A	1	SPRING, Regulating (30 psi)	R431005965	P -062013-00000
14B	1	SPRING, Regulating (80 psi)	R431005489	P -060360-00000
15	2	SCREW, 8-32 x 2-1/4" (Not shown)	R431001693	P -049109-00003
16*	5	O-RING, 3/8" O.D.	See Kit	See Kit

* Recommended spare parts to be retained in stock at all times.

Available in Repair Kit form, order Part No. R431006223 (P -063392-00000)

NOTICE TO PRODUCT USERS

1. WARNING: FLUID MEDIA

AVENTICS pneumatic devices are designed and tested for use with filtered, clean, dry, chemical free air at pressures and temperatures within the specified limits of the device. For use with media other than air or for human life support systems, AVENTICS must be consulted. Hydraulic cylinders are designed for operation with filtered, clean, petroleum based hydraulic fluid; operation using fire-resistant or other special types of fluids may require special packing and seals. Consult the factory.

2. WARNING: MATERIAL COMPATIBILITY

Damage to product seals or other parts caused by the use of noncompatible lubricants, oil additives or synthetic lubricants in the air system compressor or line lubrication devices voids AVENTICS warranty and can result in product failure or other malfunction. See lubrication recommendations below.

AIR LINE LUBRICANTS! In service higher than 18 cycles per minute or with continuous flow of air through the device, an air line lubricator is recommended.* (Do not use line lubrication with vacuum products.) However, the lubricator must be maintained since the oil will wash out the grease, and lack of lubrication will greatly shorten the life expectancy. The oils used in the lubricator must be compatible with the elastomers in the device. The elastomers are normally BUNA-N, NEOPRENE, VITON, SILICONE and HYTREL. AVENTICS recommends the use of only petroleum based oils without synthetic additives, and with an aniline point between 180° F and 210° F.

COMPRESSOR LUBRICANTS! All compressors (with the exception of special "oil free" units) pass oil mist or vapor from the internal crankcase lubricating system through to the compressed air. Since even small amounts of non-compatible lubricants can cause severe seal deterioration (which could result in component and system failure) special care should be taken in selecting compatible compressor lubricants.

3. WARNING: INSTALLATION AND MOUNTING

The user of these devices must conform to all applicable electrical, mechanical, piping and other codes in the installation, operation or repair of these devices.

INSTALLATION ! Do not attempt to install, operate or repair these devices without proper training in the technique of working on pneumatic or hydraulic systems and devices, unless under trained supervision. Compressed air and hydraulic systems contain high levels of stored energy. Do not attempt to connect,

disconnect or repair these products when a system is under pressure. Always exhaust or drain the pressure from a system before performing any service work. Failure to do so can result in serious personal injury.

MOUNTING! Devices should be mounted and positioned in such a manner that they cannot be accidentally operated.

4. WARNING: APPLICATION AND USE OF PRODUCTS

The possibility does exist for any device or accessory to fail to operate properly through misuse, wear or malfunction. The user must consider these possibilities and should provide appropriate safe guards in the application or system design to prevent personal injury or property damage in the event of a malfunction.

5. WARNING: CONVERSION, MAINTENANCE AND REPAIR

When a device is disassembled for conversion to a different configuration, maintenance or repair, the device must be tested for leakage and proper operation after being reassembled and prior to installation.

MAINTENANCE AND REPAIR! Maintenance periods should be scheduled in accordance with frequency of use and working conditions. All AVENTICS products should provide a minimum of 1,000,000 cycles of maintenance free service when used and lubricated as recommended. However, these products should be visually inspected for defects and given an "in system" operating performance and leakage test once a year. Where devices require a major repair as a result of the one million cycles, one year, or routine inspection, the device must be disassembled, cleaned, inspected, parts replaced as required, rebuilt and tested for leakage and proper operation prior to installation. See individual catalogs for specific cycle life estimates.

6. PRODUCT CHANGES

Product changes including specifications, features, designs and availability are subject to change at any time without notice. For critical dimensions or specifications, contact factory.

*Many AVENTICS pneumatic valves and cylinders can operate with or without air line lubrication; see individual sales catalogs for details.

LIMITATIONS OF WARRANTIES & REMEDIES

AVENTICS warrants its products sold by it to be free from defects in material and workmanship to the following:

For twelve months after shipment AVENTICS will repair or replace (F.O.B. our works), at its option, any equipment which under normal conditions of use and service proves to be defective in material or workmanship at no charge to the purchaser. No charge will be made for labor with respect to defects covered by this Warranty, provided that the work is done by AVENTICS or any of its authorized service facilities. However, this Warranty does not cover expenses incurred in the removal and reinstallation of any product, nor any downtime incurred, whether or not proved defective.

All repairs and replacement parts provided under this Warranty policy will assume the identity, for warranty purposes, of the part replaced, and the warranty on such replacement parts will expire when the warranty on the original part would have expired. Claims must be submitted within thirty days of the failure or be subject to rejection.

This Warranty is not transferable beyond the first using purchaser. Specifically, excluded from this Warranty are failures caused by misuse, neglect, abuse, improper operation or filtration, extreme temperatures, or unauthorized service or parts. This Warranty also excludes the use of lubricants, fluids or air line additives that are not compatible with seals or diaphragms used in the products. This Warranty sets out the purchaser's exclusive remedies with respect to products covered by it, whether for negligence or otherwise. Neither, AVENTICS nor any of its affiliates will be liable for consequential or incidental damages or other losses or expenses incurred by reason of the use or sale of such products. Our liability (except as to title) arising out of the sale, use or operation of any product or parts, whether on warranty, contract or negligence (including claims for consequential or incidental damage) shall not in any event exceed the cost of replacing the defective products and, upon expiration of the warranted period as herein provided, all such liability is terminated. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WHETHER FOR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE.** No attempt to alter, amend or extend this Warranty shall be effective unless authorized in writing by an officer of AVENTICS Corporation.

AVENTICS reserves the right to discontinue manufacture of any product, or change product materials, design or specifications without notice.

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